

AMENDMENTS IN THE SPECIFICATION

Please amend the specification as indicated below. The language being added is underlined (“___”) and the language being deleted contains strikethrough (“—”):

Please substitute the following paragraph for the paragraph beginning on page 1, line 10:

a1
Many different types of data storage systems exist and are currently being used to store and access various types of data media, such as optical disks and magnetic tape cartridges to name a few, so that data may be read from and/or written to the data media. Typically, data storage systems include many media storage devices for storing a group of data media, one or more data exchange devices for reading from and/or writing to the data media, and a media handling device for transferring the data media between the media storage devices and the data exchange devices. A typical example of a data storage system is disclosed in U.S. Patent Application Serial No. 09/045,134, entitled “Multi-Plane Translating Cartridge Handling System,” now U.S. Patent No. 6,025,972, issued on February 15, 2000, which is hereby incorporated by reference in its entirety.

Please substitute the following paragraph for the paragraph beginning on page 2, line 5:

a2
The data exchange devices and the media storage devices are typically positioned at various locations around the media handling device so that the media handling device may access the data media stored in the media storage devices. Examples of media storage devices are disclosed in U.S. Patent No. 6,042,205, issued on March 28, 2002, entitled “Media Holding Device Incorporating A Media Locking Mechanism” and U.S. Patent

A2
Cons Application Serial No. 09/257,322, entitled "Data Cartridge Exchange Apparatus," which are hereby incorporated by reference in their entirety.

Please substitute the following paragraph for the paragraph beginning on page 13, line

4:

A3
Media handling system 200 may further comprise a data medium access device 216 configured for loading data media 102 to and from media storage devices 106 and data exchange devices 108. In certain embodiments, data media access device 216 may be configured as described in U.S. Patent Application Serial No. 09/045,558, entitled "Cartridge Engaging Assembly with Rack Drive Thumb Actuator System," now U.S. Patent No. 6,160,786, issued on December 12, 2000, which is hereby incorporated by reference in its entirety. In other embodiments, data medium access device 216 may be configured as described in the following U.S. patents, which are all hereby incorporated by reference in their entirety: U.S. Patent No. 4,998,232 entitled "Optical Disk Handling Apparatus with Flip Latch;" U.S. Patent No. 5,010,536 entitled "Cartridge Handling System;" U.S. Patent No. 5,014,255 entitled "Optical Disk Cartridge Handling Apparatus with Passive Cartridge Engagement Assembly;" and U.S. Patent No. 5,043,962 entitled "Cartridge Handling System." The precise configuration of data medium access device 216 is not relevant. Thus, one of ordinary skill in the art will appreciate that there are various other embodiments of data medium access device 216.

Please substitute the following paragraph for the paragraph beginning on page 16, line

8:

A4
As stated above with respect to FIG. 3, in various embodiments of data storage system 100, media storage devices 106 may be arranged in a plurality of vertical stacks 300. In such

embodiments, data storage system 100 further comprises a lift assembly 600 (FIG. 6) operable to engage with and move ~~moving~~ media handling system 200 to access data media 102 arranged in the vertical stacks 300. The precise configuration of lift assembly 600 is not critical. As understood by one of ordinary skill in the art, lift assembly 600 may be configured in any of a variety of ways.

Please substitute the following paragraph for the paragraph beginning on page 30, line 1:

As best illustrated in FIGs. 42 41 and 43, lift frame 612 may also include one or more frame assembly retention springs 4104 affixed to lift frame 612. Frame assembly retention springs 4104 may be configured to engage frame assembly 214 when frame assembly 214 is installed in lift frame 612. Furthermore, frame assembly retention springs 4104 provide a force against frame assembly 214 to prevent frame assembly 214 from losing engagement with lift frame 612 and thereby retaining frame assembly 214 within lift frame 612. The embodiment shown in FIG. 42 43 illustrates that frame assembly retention springs 4104 may be configured with an elongate portion and a triangle-shaped portion latch portion. Frame assembly retention spring 4104 may be affixed to lift frame 612 at one end of the elongate portion. The triangle-shaped portion may be attached to the elongate portion such that the angled portion faces a front portion of lift frame 612. As described below, when frame assembly 214 is inserted within lift frame 612, the back portion 414 of frame assembly 214 deflects frame assembly retention spring 4104. When frame assembly 214 is positioned properly within lift frame 612, frame assembly retention spring 4104 may return to an initial position in which the straight side of the triangle-shaped portion engages the front portion 412 of frame assembly 214, thereby securing frame assembly 214 within lift frame 612.

Please substitute the following paragraph for the paragraph beginning on page 31, line

7:

ag In operation, frame assembly 214 may be installed in the lift frame 612 through and opening in the front of the lift frame 614. Accordingly, the lift frame 614 may comprise a box frame configured with five-sides such that each side has an opening adapted to enable the data medium access device 216 (FIG. 5) contained within the frame assembly 214 to access, during operation of data storage system 100, the data media 102 positioned around frame assembly 214. The frame assembly 214 may be guided into the lift frame 612 by lift frame guide members 4202 and guide members 4200. Guide members 4200 on the frame assembly 214 engage lift frame guide members 4202 and align the frame assembly 214 to the lift frame 612. The frame assembly retention springs 4104 are configured to secure the frame assembly 214 in the lift frame 612. In order to remove the frame assembly 214 from the lift frame 612, the frame assembly retention springs 4104 may be deflected, thereby allowing the frame assembly 214 to be removed from the lift frame 612 in the manner described above.

Please substitute the following paragraph for the paragraph beginning on page 35, line

1:

at Referring to FIGS. 12 – 14, one embodiment of drawer 114 may comprise a storage tray 1200 that may be mounted directly to a mounting system 1330 (FIG. 13) in the manner that will be described in greater detail below. Storage tray 1200 may be configured to removably receive one or more media storage devices 106. Storage tray 1200 is illustrated in FIGS. 12-14 as receiving two media storage devices 106. Media storage devices 106 may be configured to receive one or more data medium 102. Media storage devices 106 are illustrated in FIGS. 12-14 as configured to removably receive five data media 102. Referring to FIG. 13, Storage storage tray 1200 may comprise a generally rectangular member having a

ay
any

floor section 1302, a back section 1300, and opposed end walls 1202 and 1204. Storage tray 1200 may also be provided with a center divider section 1304 located substantially between end walls 1202 and 1204. Each end wall 1202 and 1204 may be provided with a spring member 1306 to urge media storage device 106 against center divider section 1304, although spring member 1306, or urging media storage device 106 against center divider section 1304, is not required.

Please substitute the following paragraph for the paragraph beginning on page 40, line

7:

as

As understood by one of ordinary skill in the art, the various embodiments of data media exchange apparatus 120 may be mounted directly to data storage system 100 in a variety of ways. For example, as described above in detail with respect to FIGS. 15 – 20, data media exchange apparatus 120 may be mounted directly to mounting system 1330. In this embodiment, mounting system 1330 enables an operator or service personnel to manually extend and/or retract data media exchange apparatus 120. Various other systems and methods exist for enabling the data media exchange apparatus 120 to extend and/or retract as described above. In one of many possible embodiments, an automated media exchange system 3100 (FIGS. 31-32) may be provided in conjunction with mounting system ~~1300~~ 1330 and data media exchange apparatus 120. Automated media exchange system 3100 enables an operator to automatically control the operation of data media exchange apparatus 120. In other words, automated media exchange system 3100 enables an operator to automatically control how far media exchange apparatus 120 is retracted and/or extended from data storage system 100. In this manner, an operator may designate a particular data medium 102 located in a particular data media exchange apparatus 120. Based on the particular data medium 102 designated, automated media exchange system 3100 may automatically extend the particular data media

ag
con 7

exchange apparatus 120 an appropriate distance so that the operator may access the particular data medium 102. Automated media exchange system 3100 may also enable the operator to control, for example, via a control panel, how far to extend and/or retract data media exchange apparatus 3100.

Please substitute the following paragraph for the paragraph beginning on page 41, line

7:

ag

Automated media exchange system 3100 may include a drive system 3102, an elongate drive member 3112 engaged by drive system 3102, and a mounting system, such as mounting system 1330. One of ordinary skill in the art will appreciate that various mounting systems may be employed by automated media exchange system 3100. As described above in detail, mounting system ~~1300~~ 1330 may comprise three guide rails 1400, 1308, and 1332, which are configured to be mounted in sliding engagement with one another so as to allow drawer 114 to be moved between the extended and retracted positions as described above. Referring to FIG. 31, in one of many possible embodiments, guide rail 1400 may be mounted directly to housing 104 (FIG. 14) of data storage system 100 by a plurality of screws (not shown).

Please substitute the following paragraph for the paragraph beginning on page 43, line

1:

ag

Referring to FIGS. 13, 14, and 21, data cartridge exchange apparatus 120 may further comprise a media storage device alignment apparatus ~~1314~~ (e.g., 1316 and 1312), to provide more precise positioning of media storage devices 106 when drawer 114 is in the fully retracted position. The media Media-storage device alignment apparatus ~~1314~~ may comprise a pair of elongate reference rails 1316 and 1312, which are mounted in spaced-apart relation

210
conf

to housing 104 of data storage system 100 as best illustrated in FIG. 14. Each media storage device 106 may be provided with first and second elongate slots 1320 and 1322, which are sized to slidably engage respective elongate reference rails 1316 and 1312 when drawer 114 is moved to the retracted position. The engagement of elongate reference rails 1316 and 1312 with respective slots 1320 and 1322 in media storage devices 106 slightly lifts media storage devices 106 from drawer 114 and holds each media storage device 106 in a registration position 2104, as best illustrated in FIG. 21. Consequently, when drawer 114 is fully retracted, the positions of media storage devices 106 may be determined by the media storage device alignment apparatus ~~1314~~ and not by drawer 114.

Please substitute the following paragraph for the paragraph beginning on page 43, line 15:

211

The media ~~Media~~ storage device alignment apparatus ~~1314~~ more accurately positions media cartridge devices 106 than would be possible if media storage devices 106 were to remain seated in storage tray 1200 of drawer 114. The more accurate positioning provided by the media storage device alignment apparatus ~~1314~~ substantially improves the likelihood that media handling system 200 will be capable of properly engaging the selected data medium 102. This configuration also dispenses with the need to provide a high precision drawer mounting system. In other words, since media storage devices 106 are not held in position by drawer 114, drawer 114 need not be designed to return media storage devices 106 to their exact locations each time drawer 114 is closed.

Please substitute the following paragraph for the paragraph beginning on page 53, line

18:

ai2
The mounting portion ~~2746~~2736 may have a plurality of spring tabs (not shown) located opposite a front edge 2746 of spring mechanism 2730. The front edge 2746 may abut spring guides 2734. The spring guides 2734 may be adapted to fit in the openings (not shown) of the spring locks 2732. The combination of the spring guides 2734 and the spring locks 2732 allows the spring mechanism 2730 to be attached to the top portion 2708 of the housing 2702 without the need of fasteners. They further properly align the spring mechanism 2730 relative to the housing 2702.

Please substitute the following paragraph for the paragraph beginning on page 63, line

20:

ai3
As stated above, integrated data media exchange/storage device 2700 may include a spring mechanism 2730 fixedly attached to top portion 2714 of housing 2702 for retaining data media 102 positioned in slots 2722. Spring mechanism 2730 provides a force for securing data media 102 in slots 2722 in housing 2702. In the embodiment described above with respect to FIGS. 27 – 30, the combination of the spring guides 2734 and the spring locks 2732 allow the spring mechanism 2730 to be attached to the top portion 2714 of the housing 2702 without the need of fasteners. They further properly align the spring mechanism ~~213000~~2730 relative to the housing 2702.

Please substitute the following paragraph for the paragraph beginning on page 64, line

7:

ai4
One of ordinary skill in the art will appreciate that various other ways exist for attaching spring mechanism 2730 to housing 2702, some of which are described below.

ay
cont

These systems and methods for attaching spring mechanism 2730 to housing ~~2720~~ 2702 may be implemented in a variety of devices, such as, for example, integrated data media exchange/storage device 2700, media storage devices 106, or any other device for storing data media 102, including those disclosed in U.S. Patent No. 6,042,205.

Please substitute the following paragraph for the paragraph beginning on page 65, line

7:

as

The top portion of the housing 3402 may also have one or more spring retention members 3418 that extend from the top portion of the housing 3402. As described in detail below, in operation, each spring retention member 3418 aligns with an aperture 3420 in spring mechanism 3404 and works in cooperation with a spring alignment member 3406. Therefore, there are numerous configurations for spring retention member 3418 and aperture 3420. As illustrated in cross-section in FIG. ~~35~~ 34, in one embodiment spring retention members 3418 are substantially triangle-shaped so that they define a ramp angle that opposes a corresponding spring alignment member 3406. The spring retention members 3418 may be integrally formed into the top portion of the housing 3402, or in the alternative may be attached to the top portion of the housing 3402.

Please substitute the following paragraph for the paragraph beginning on page 65, line

17:

a¹⁶

Spring mechanism 3404 may be attached to the top portion of the housing 3402. The spring mechanism 3404 comprises a mounting portion 3410 from which extend a plurality of fingers 3412 and one or more elongate spring tabs 3414. Fingers 3412 may be configured in much the same manner as fingers ~~2730~~ 2738 (FIG. 29). As stated above, each elongate spring tab 3414 includes an aperture 3420. Aperture 3420 is positioned on the elongate spring tab

a16
cont

3414 to align with the spring retention member 3418 of housing 3402. Aperture 3420 is also configured to be placed over and retained by the spring retention member 3418 of housing 3402. Spring mechanism 3404 may also include one or more spring tabs 3416 that also extend from mounting portion 3410. Spring tabs 3416 preferably do not include an aperture 3420 and are shorter in length than elongate spring tabs 3414.

Please substitute the following paragraph for the paragraph beginning on page 66, line 7:

a17

As illustrated in FIG. 34 33, spring retention system 3400 provides for a convenient method for attaching spring mechanism 3404 to housing 3402. For example, spring mechanism 3404 may be attached to housing 3402 by placing spring mechanism 3404 flat against the top portion of housing 3402 and sliding the elongate spring tabs 3414 through the openings in spring alignment members 3406. As a spring mechanism 3404 slides across the top portion of housing 3402 and comes in contact with a spring retention member 3418, an elongate spring member 3414 deflects until the aperture 3420 engages the spring retention member 3418. Elongate spring members 3414 need not automatically deflect as a result of the sliding motion and engagement with the spring retention members 3418. For instance, the elongate spring members may be manually deflected and arranged in cooperation with spring retention member 2418. In this manner, spring alignment members 3406 may retain spring mechanism 3404 relative to lateral and vertical movement, while the engagement of apertures 3420 and spring retention members 3418 may prevent spring mechanism 3404 from sliding within the openings in the spring alignment members 3406.

Please substitute the following paragraph for the paragraph beginning on page 68, line

3:

ais
Spring mechanism 3604 may be attached to the top portion of the housing 3602. The spring mechanism 3604 comprises a mounting portion 3620 from which extend a plurality of fingers 3622 and a plurality of spring tabs 3624. Fingers ~~3620-3622~~ may be configured in much the same manner as fingers ~~2730-2738~~ (FIG. 29). Spring tabs 3624 may be configured in much the same manner as ~~tabs-spring locks~~ 2732 (FIG. 29). As best illustrated in FIG. 37, spring retention system 3600 provides for another convenient method for attaching spring mechanism 3604 to housing 3602. For example, spring mechanism 3604 may be attached to housing 3402 by sliding spring tabs ~~3424-3624~~ through the openings in spring alignment members 3606. As spring mechanism 3604 slides, mounting portion 3620 may apply a force to tab portion 3612, thereby deflecting guide tab 3608 away from the top portion of housing 3602. This deflection enables spring mechanism 3604 to be easily positioned with respect to spring alignment members 3606. When spring mechanism 3604 is in the proper position within spring alignment members 3606, the edge of the mounting portion 3620 of spring mechanism 3604 preferably clears the tab portion 3612 of guide tab 3608, thereby returning... the guide tab 3608 to the un-deflected position. In the un-deflected position, guide tabs 3608 prevent spring mechanism 3604 from sliding within the openings in the spring alignment members, while the spring alignment members 3606 retain spring mechanism 3604 relative to lateral and vertical movement.